**Rendaku as a means of identity avoidance within and between morphemes**

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Recent experimental approaches to *rendaku* (sequential voicing) have suggested that identity avoidance is the primary motivation for rendaku. Kawahara and Sano (2014; K&S hereafter) demonstrated in a series of wug-tests that the rendaku rate increased in noun compounds where the last mora of the first constituent (C1) and the first mora of the second constituent (C2) were identical in the original form. They also showed that the *rendaku* rate decreased when the output would contain a sequence of identical mora across a morpheme boundary. Kumagai (2017) examined the OCP-labial effects of C2 (following a mora starting with /h/) of a compound and demonstrated that the applicability of the /h -> b/ rendaku differed by the degree of similarity among labial consonants in the subsequent moras in the input. We conducted two experiments, also wug-type naming tests, to further investigate the issue.

In Experiment 1, C1 was an existing bi-moraic word and C2 was always a tri-moraic nonce word where the initial mora was manipulated as to whether it was identical to the following mora within the word (e.g., *kakara* vs. *kasura*, see (1)). This was to test whether the identity avoidance effect (triggering rendaku) is applicable to a sequence already present in the original input. We found a significantly higher rendaku rate in the identical condition than in the non-identical condition (see Figure1). This shows that the mora-level identity preexisting in the input can motivate rendaku to alter the input to eliminate two identical moras in a row.

Experiment 2 created a tug-of-war situation between identity avoidance across a morpheme boundary and identity avoidance within the input. C1 was either Nara or Naha (names of existing cities) to create contrast regarding whether the last mora is identical to the first mora of C2 (thereby motivating identity avoidance). C2, a nonce word, always began with *ha*. Note that *ha* becomes *ba* by rendaku and acquires +bilabial and +voice. The second mora of C2 was either *m* (+bilabial, +sonorant), *n/r* (-bilabial, +sonorant) or *s/t/k* (-bilabial, -sonorant). Based on Kumagai, we predicted the presence of the +bilabial feature of the second mora of the compound head would have a negative influence on the application of rendaku. We further tested if (i) the presence of another type of overlapping phonological feature (+sonorant) is relevant in the degree of similarity between the two adjacent moras, and (ii) the similarity between the two moras within C2 counteracts the motivation for identity avoidance across the morpheme boundary (for example, *naha*+*hamara* would be a case where two motivations are in conflict). We found a significant main effect of C1 type on the rendaku rate, reconfirming the motivation of preempting two identical mora in the compound output. There was a gradient effect against rendaku application as a function of the degree of similarity between the first two moras in C2 involving both labial (replicating Kumagai 2017) and sonorant features. As Figure 2 shows, the rendaku rate increased in the following order: +bilabial, +sonorant < -bilabial, +sonorant < -bilabial, -sonorant; each comparison showed a significant difference.

The results together demonstrated that rendaku is motivated by identity avoidance, not only by preempting the identity sequence that would occur in the output, but also by eliminating a sequence of the same phonological features (with respect to +sonorant as well as +labial) in adjacent moras within the input.
Reference

Examples
(1) mori + kakara (identical) /kasura (non-identical)  
forest  nonce word  
→ mori-kakara (kasura) or mori-gakara (gasura)

(2) nara + hamara (+bilab, +sono) /hanara (-bilab, +sono) / hasura (-bilab, -sono)  
Nara  nonce word  
naha + hamara (+bilab, +sono) /hanara (-bilab, +sono) / hasura (-bilab, -sono)  
Naha  nonce word

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**Figure.1** Average probability of rendaku application in both conditions. The y-axis represents the rate of rendaku application, and the x-axis shows the identical and non-identical conditions.

**Figure.2** Average percentages of rendaku application in the three conditions of consonantal features of the second mora in a compound head. The y-axis in Figure.2 shows the rates of rendaku application, and the x-axis shows the three conditions: m (+bilabial, +sonorant) vs. n/r (-bilabial, +sonorant) vs. s/t/k (-bilabial, -sonorant).